IAPMO GPMCS raising the bar for water, energy efficiency

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In the October issue of
Plumbing Engineer
, “Into the Code” announced a new initiative under way toward developing ASHRAE 189.1 Standard for the Design of High-Performance, Green Buildings Except Low-Rise Residential Buildings into a combined and harmonized standard. This brought together numerous green and sustainability codes and standards under a unified framework. IAPMO is encouraged by this endeavor since it promises to raise the bar for sustainable design and construction that will drive greater acceptance in the building community. IAPMO has already made great strides in raising this bar for water and energy efficiency, as seen in the Green Plumbing and Mechanical Code Supplement (GPMCS), with the third edition to be released in the second quarter of 2015. Still under development, the 2015 GPMCS concluded its public comment period Nov. 24 on all new proposals that promise to raise the bar another notch.

With the call for public comments for the 2015 GPMCS under way, ASHRAE and the U.S. Green Building Council released the 2014 edition of Standard 189.1 in November 2014. Relative to the 2011 edition of ASHRAE 189.1, we find increased stringency of water use for plumbing fixtures and appliances, updated Energy Star references, enhanced requirements for stormwater management, updated references to ASHRAE Standard 90.1 to the 2013 edition, and equipment efficiency tables that supersede ASHRAE Standard 90.1-2013 when using the alternate renewable approach.

Relative to the 2012 GPMCS, we find good agreement with ASHRAE 189.1-2014 with respect to plumbing fixtures. Both reflect the same water efficiencies for toilets, urinals, lavatory faucets, showerheads and commercial pre-rinse spray valves and when applicable, reference is made to the WaterSense specification. New to ASHRAE 189.1-2014 is the flow rate restriction for residential kitchen faucets. Corresponding with the 2012 GPMCS, residential kitchen faucets have a reduced

flow rate of 1.8 gpm with an allowed temporary override to 2.2 gpm.

The 2015 GPMCS proposes to raise the bar above ASHRAE 189.1-2014 on a few items relating to plumbing fixtures. Shower valves have already been required to meet ASSE 1016 or ASME A112.18.1/CSA B12.1 for temperature control when tested at 2.0 gpm in the 2012 GPMCS. As shower heads are now produced for flow rates lower than 2.0 gpm, the 2015 GPMCS is proposing that the shower valves meet the same standard requirements, but tested at a flow rate of 1.5 gpm ± 0.1 gpm, or provide scald and thermal shock protection for the rated flow rate of the installed shower head. As the bar of water efficiency is raised for showers, so is the required protection.

Another item that proposes higher water efficiency levels in the 2015 GPMCS is the often-overlooked tub spout diverter leakage. The 2015 GPMCS proposes to exceed the 2012 GPMCS requirement by restricting the leakage from 0.1 gpm to 0.01 gpm before the life cycle test and no more than 0.05 gpm after the life cycle test when tested in accordance with ASME A112.18.1/CSA B125.1. This will reduce unintended water being wasted through tub spout leakage when showering.

A fixture item rising to the fore, especially where water conservation is at emergency measures is the waterless toilet, better known as a composting toilet. With no water connections to the toilets, the potential water savings promises to be significant. The 2015 GPMCS proposes to raise the bar for this measure of conservation as well. Proposed for 2015 are provisions not only for composting toilet systems, but provisions for urine diversion systems as well. Municipalities in serious need of water conservation may turn to the 2015 GPMCS to adopt composting provisions and eliminate the need for water-supplied toilets. However, it is expected that composting toilets will remain primarily installed in remote areas where supplied water is unavailable. Regardless, the new provisions in the GPMCS represent the first codified requirements for the safe installation, maintenance and use for these fixtures in any installation.

As we look at appliances, we again find good agreement between the 2012 GPMCS and ASHRAE 189.1-2014. Both require dishwashers and clothes washers to meet Energy Star requirements. Newly added to ASHRAE 189.1-2014 are water factor requirements, in addition to the energy requirements per Energy Star. There is an additional appliance for which the 2015 GPMCS is proposing to raise the bar for water efficiency – food waste grinders. Food waste grinders can waste significant amounts of water. Commercial food waste grinders would be restricted to a maximum of 8 gpm under full load and 1 gpm under no load. Additional provisions are included for pulpers and mechanical strainers.

Turning to commercial food services, there are some efficiency differences between the 2012 GPMCS and
ASHRAE 189.1-2014, with the 2015 GPMCS proposing to widen the margin of efficiencies even further. Both reference Energy Star for commercial air-cooled ice machines, but the 2015 GPMCS proposes to add an efficiency margin for cubed, nugget and flake ice makers that is lacking in the Energy Star specification. Cubed Ice makers will need to meet the water efficiency of 20 gallons per 100 pounds of ice, and ice makers producing nugget and flake ice shall meet the water efficiency of 14 gallons per 100 pounds of ice.

Both the 2012 GPMCS and ASHRAE 189.1-2014 recognize only boilerless/connectionless food

steamers with differing efficiency margins, 5.0 gallons per pan and 2.0 gallons per hour, respectively. The 2015 GPMCS further proposes distinguishing between boilerless-type steamers and boiler-type steamers. The former water efficiency margin is set at 2.0 gallons per compartment and the latter margin at 1.5 gallons per pan per hour.

The combination oven also has differing efficiency margins between the 2012 GPMCS and ASHRAE 189.1-2014: 3.5 gallons per pan and 10 gallons per hour respectively. The 2015 GPMCS proposes raising the efficiency bar, prohibiting combination ovens from using water in the convection mode except when utilizing a moisture nozzle for food products in the oven. The total amount of water used by the moisture nozzle in the convection mode shall not exceed one-half gallon per hour per oven cavity. When operating in the steamer mode, combination ovens shall use no more than 1.5 gallons per hour per pan. This is a significant efficiency margin for food services.

For service water heating, both the 2012 GPMCS and ASHRAE 189.1-2014 reference ASHRAE 90.1. The 2012 GPMCS references the ASHRAE 90.1-2010 edition that will be updated to the ASHRAE 90.1-2013 in the 2015 GPMCS, as did ASHRAE 189.1 for the 2014 edition. Additionally, the 2012 GPMCS raises the bar for water and energy efficiency by requiring greater pipe insulation thickness for domestic hot water above that of ASHRAE 189.1-2014, and restricting the volume of hot water between the water heater or recirculation loop and the fixture fitting. The 2015 GPMCS proposes modifying the hot water volume restriction to a branch length of 15 feet or 24 ounces, whichever is less.

With respect to HVAC energy efficiency, both the 2012 GPMCS and ASHRAE 189.1-2014 reference ASHRAE 90.1, with the latter exceeding ASHRAE 90.1-2013 for equipment efficiency (for the alternate renewable approach only), economizers and kitchen exhaust. The 2015 GPMCS proposes exceeding ASHRAE 189.1-2014 regarding air economizers by requiring fault detection and diagnostics for all newly installed air-cooled unitary direct-expansion units be equipped with an economizer as required by prescribed climate zones.

ASHRAE 189.1-2014 has enhanced stormwater management to include infiltration, evapotranspiration, rainwater harvesting, stormwater collection, and retention requirements for greenfield, grayfield and Brownfield sites. The 2015 GPMCS has been awaiting the completion of ARCSA/ASPE/ANSI 78 – Stormwater Catchment Systems to be included in a new section for stormwater management. To date this standard is not finalized and may be considered as an addendum to the 2015 GPMCS at a later time.

As IAPMO raises the bar for water and energy efficiencies in the GPMCS, we are confident that other green codes and standards will follow in due course for sustainable design and construction that will drive greater acceptance in the building community.

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